

REMARKS

Claims 1-36 are currently pending in the present application.

In the Office Action, the Examiner acknowledges *Applicant's election of claims 28-31, with traverse*. The Examiner contends that the Restriction Requirement is proper on the basis that the Groups possess "technical differences," and makes the Requirement final. Applicant again respectfully traverses the Requirement, and requests reconsideration by the Examiner prior to the necessity of petitioning the Requirement. Specifically, Applicant notes that any analysis under Unity of Invention (as appropriate in this application which is a national stage entry under §371), must be based first on the *independent* claims. (See, M.P.E.P. (Rev. 7), §1850(II), p. 1800-99).

"Unity of invention has to be considered in the first place only in relation to the independent claims in an international application and not the dependent claims."
(See, M.P.E.P. (Rev. 7), §1850(II), p. 1800-99)

As indicated in Applicant's reply to the Restriction Requirement dated June 8, 2009, at least Groups I, II and IV contain a linking special technical feature (as embodied in independent claims 1, 28 and 34), and should properly be examined together. The features of the dependent claims to which the Examiner refers in the Office Action are an *improper* basis upon which to insist upon Restriction under Unity of Invention analysis. Reconsideration and rejoinder of at least Groups I, II, and IV, for at least this reason and those advanced in Applicant's reply dated June 8, 2009, are respectfully requested.

The Rejection Under 35 U.S.C. §103(a):

In the Office Action, the Examiner rejects claims 28-31 under 35 U.S.C. §103(a), as being obvious over U.S. Pat. App. Pub. No. 2002/0112789 of Jepson, *et al.* ("Jepson"), in

view of U.S. Pat. No. 6,283,357 of Kulkarni, *et al.* ("Kulkarni"), further in view of U.S. Pat. No. 6,142,001 of Collier ("Collier").

Specifically, the Examiner contends that Jepson discloses repeated forging and annealing steps for the production of a sputtering target. The Examiner acknowledges that Jepson does NOT teach deep-drawing and the attachment of a collar to the target. In an attempt to remedy this admitted deficiency of Jepson, the Examiner argues that Kulkarni discloses the deep-drawing of a rolled target plate and the attachment of a collar. The Examiner argues that it would have been obvious to one of ordinary skill in the art to deep-draw the target of Jepson using the disclosure of Kulkarni, and further attach a collar according to Kulkarni to arrive at a cup shape magnetron sputtering target. However, the Examiner further acknowledges that the Jepson/Kulkarni combination still fails to teach the claimed finite element modeling. In an attempt to remedy this admitted deficiency of the Jepson/Kulkarni combination, the Examiner argues that one of ordinary skill in the art would have been motivated to employ finite element modeling, as used in Collier, with the combined disclosure of Jepson and Kulkarni to determine target size during processing.

Applicant respectfully traverses the Examiner's rejection and the arguments and contentions set forth in support thereof for at least the following reasons.

To begin with, Applicant respectfully reiterates that the claimed invention is directed to a sputtering target comprising a refractory metal pot and a collar attached thereto, wherein the pot is prepared by a process comprising (a) through (k), in said order: (a) cutting an ingot; (b) upset forging; (c) annealing; (d) forging-back; (e) upset forging; (f) forging-back; (g) annealing; (h) upset forging; (i) annealing; (j) rolling; and (k) deep-drawing; wherein dimensions of at least one of the workpieces are pre-determined with a computer-implemented finite element modeling assessment.

It is important to recognize that in accordance with the claimed invention, each of the forgings (upset forgings; (b), (e) and (h)) and the forgings-back ((d) and (f)) are carried out along the same axis. “Upset forging” compresses a workpiece (generally a cylinder shape) in a direction along or in-line with its longitudinal axis. Forging back draws the compressed workpiece back into a more elongated cylinder shape *along the same axis*. Thus, while Jepson does describe the preparation of a plate comprising a refractory metal wherein multiple forgings and annealing steps are carried out, it is critical to recognize that the processes described in Jepson require side-forging to produce the generally rectangular plates described therein. In contrast to the claimed invention, *Jepson describes processes wherein a workpiece is side-forged in a direction perpendicular to the original longitudinal axis of the workpiece*. (See, e.g., Jepson, Fig. 1, and ¶ [0014], “. . . pressure working the pieces along alternating essentially orthogonal work axes.”).

Thus, to begin with, Jepson does not teach or suggest the claimed process for forming the claimed pot. One of ordinary skill in the art would have *no reasoned motivation to exclude the specifically required side-forging* of the Jepson reference. Stated another way, one of ordinary skill in the art would have no motivation to modify Jepson to carry out repeated forgings and forging-back operations along the same axis. It is also important to recognize that the claimed process of forming the pot results in differences in the pot *per se*, not merely in the process by which it is formed. For example, by specifically upset forging the annealed fifth workpiece, *rather than flat-forging* (i.e., side forging), the through-thickness texture gradient is improved. (See, e.g., Applicant’s Specification, p. 6, lines 23-29; ¶ [0025] as published).

Kulkarni fails to remedy this deficiency of the Jepson reference. Accordingly, Applicant respectfully submits that the combination of Jepson and Kulkarni fails to teach or suggest each and every element of Applicant’s claimed invention, even before considering the additionally required use of finite element modeling as claimed.

The Examiner cites Collier to address the failure of the Jepson/Kulkarni combination to teach or suggest the use of finite element modeling. Applicant respectfully submits that Collier's use of finite element modeling in the billet piercing extrusion of steel (or alloys thereof) to form gas cylinders is *not* a basis upon which one of ordinary skill in the art would find motivation to apply such modeling to the production of refractory metal pots for sputtering targets.

To begin with, the fabrication of steel gas cylinders and the production of sputtering targets are not analogous arts. Moreover, the use of finite element modeling in Collier to help ensure that an inner cylinder liner fits an outer cylinder shell would not motivate one of ordinary skill in the art of sputtering target formation to employ finite element modeling to size sputtering target workpieces to achieve workings that lead to more uniform grain-size and more uniform crystallographic texture. (*See, e.g.*, Applicant's Specification, p. 11, lines 15-19 & p. 15, lines 10-18). The use of finite element modeling in the claimed invention to avoid "folds" and other imperfections in the claimed pots is entirely different than the use of such modeling in Collier to achieve uniform cladding of the disclosed gas cylinders. Collier, at best, merely serves to evidence that finite element modeling exists as a tool in gas cylinder formation. There is no teaching or suggestion to use any such system in the production of refractory metal sputtering targets.

Accordingly, Applicant respectfully submits that one of ordinary skill in the art would have no motivation to modify the cited combination of Jepson and Kulkarni with the teachings of Collier, and certainly not in a manner whereby dimensions of a target workpiece are modeled to avoid folds and other imperfections of importance in the deep-drawn, pot-shaped, sputtering target field. Thus, the combination of Jepson, Kulkarni and Collier fails to satisfy the criteria necessary to establish *prima facie* obviousness. Reconsideration and withdrawal of the rejection are respectfully requested.

Conclusion:

Applicant respectfully submits that all pending claims patentably distinguish over the prior art of record. Thus, withdrawal of the rejection and a Notice of Allowance are respectfully requested.

Respectfully submitted,

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